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ABSTRACT

The paper describes a method of using simulation games with inverted maps to teach college undergraduates basic cartographic and spatial knowledge in geography. The author discusses the nature of simulation gaming in terms of the conflicting needs for structure and open-endedness, then identifies his major objective in developing the new approach. His dilemma was to construct an instructional simulation game which was relevant to the real world but simplified enough so that the process was emphasized more than the conclusion. The use of inverted (upside-down) maps was the answer. By using inverted, mirror-image maps of particular countries or regions, one can create illusions of imaginary countries. Students are fooled by the inverted images and therefore are not distracted by their prior knowledge or attitudes about certain countries' political or economic aspects. In the author's game, students are given an inverted map of Africa with the five major regions delineated under imaginary names. Real data reflecting the population dynamics of these regions are provided, and students must evaluate the data to determine which region most desparately needs economic aid from the United Nations. Afterwards, the teacher relates the experience to the real world by presenting the game-map in its correct perspective. (AV)

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"THE USE OF INVERTED MAPS IN SIMULATION GAMING OR, TAKING ADVANTAGE OF STUDENT IGNORANCE"

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The disemphasis of the capes and bays approach to geographical education in secondary schools has led to a recognition that undergraduates often enter colleges and universities lacking essential spatial knowledge. It is realized that encyclopedian learning of countries, cities, waterbodies and topographic features is not the ideal method of gaining spatial information, but when students have this knowledge the instructor's job is much easier. In order to correct this problem, the introductory, university, geography course must include remedial activities. The dilemma which faces geographers is how to carry out remedial spatial knowledge-attainment without seriously depleting the time available to adequately cover the syllabus. One strategy that helps to solve the dilemma is the instructional simulation game.

The game as used here is designed to meet several objectives. It must naturally fit well into the syllabus. This alone can be a major problem since games are ultimately designed by instructors to meet their particular requirements. It becomes the responsibility of the individual to adapt existing games or evolve new ones to fit one's own needs. The game can be used in addition to provide the instructor with a means of teaching cartographic and spatial information. This latter aim, in a sense, relies on student ignorance. The map which accompanies the game (one should expect that in a geographical game the map would play an important role) permits the operation of the game-plan without spatial or attitudinal interference. This gaming method is built around real data in

a real situation. The game-map is a simplified inverted image of reality. By inverting the game-map the background 'noise' of politics, race, economics, or other disruptive elements not essential to the playing of the game can be eliminated. During the evaluation, these elements can then be re-introduced and the data brought into focus with reality.

The Use of Simulation Gaming in Geography:

It must be emphasized that this paper is not an empirical study of the cognitive or affective achievements of simulation games. No testing of hypotheses was attempted. Grading on anything but participation was found to be impractical. There was no attempt made to discern whether or not students learned more through simulation exercises or lectures. In fact, it has been accepted that simulation gaming can be as effective as any other mode of teaching in knowledge-attainment and, therefore, technique testing is not a requirement. It appears that the acceptance of simulation gaming as an effective teaching method is the consensus of most educational researchers (Hunter and Clark, 1977).

One value of simulation exercises appears to be that they permit alternate instructional methods. Walford (1969) found that the introduction of new teaching procedures often raised the interest levels of students. The variety of instructional styles seems to have the effect of "... shaking a class from its customary lethargies"(Walford, p. 11). In essence, educational simulation can be called a "Hawthorne Effect" (Mayo,

1957), in which the method is accepted to be of value simply because it is an impetus to learning, and, as Butt (1975, p. 2) has stated, the instructional game "... combines the potential of being representative of some aspect of reality with the human tendency to engage in gaming."

Since it has been accepted by most that simulation gaming is no longer an experimental tool of a few but rather is an acknowledged and frequently used teaching medium, it is important to try to structure the learning experience as much as possible in order to achieve the course goals. At the same time, one wishes to stay as far as possible away from the group-encounter jam session. At the risk of being pedantic, one could characterize this problem by paraphrasing the ard" -'to structure or not to structure, that is the question.' In addition, as Hunter and Clark (p. 45) have noted, "venturing into game research is akin to finding yourself standing in a mine field with confounding variables hidden in all directions." One such variable, and an important one, is the question: how much realism is necessary in the game?

The "real world" is itself an abstract term. In a sense, the teacher is not so much bringing the real "real world" into the classroom as he is introducing instead models of reality based on what has happened in the past. Given X ergo Y is the historical example or model of reality. The model assumes certain other things besides the simple progression from point X to point Y; there were conditions present in the model that led to the decision which resulted in X to Y. In a simulation

game with a real world base, these conditions not only need to be presented but must be adhered to in order to make the exercise meaningful. There is, therefore, a need for a highly structured simulation and this leads to a step-by-step exercise which could be likened to a programmed text. To play a game to win - such as a war game - one would not need such highly structured rules because one is trying only to win, but in an instructional game winning is not the goal; reality is. As such, the highly structured nature is necessary.

On the opposite end of the spectrum, there is the educational game which is directed towards achieving an open-ended result. In this situation, the process is the more important part of the game, not the result. The instructor employing this format often uses a measure of simplification in organizing his simulation exercise. Walford (1969, p. 31) points out that simplifications "...are an aid to understanding the basic dynamics of processes uncluttered by the 'background noise' of transitory or irrelevant material." This temporary or non-relevant information is that which necessitated the structuring in the 'model of reality' type of game. In the open-structured game, the simulation technique is seen to be a convenient way to re-enact a process or situation with the major emphasis being placed on the essential problem being studied. The background noise is the other data which are not relevant to the open-ended process being considered, but might affect the ultimate outcome. A counter argument to this open

approach is that the simplification of a real-world situation could lead to a fairy tale simulation exercise that lacks applicability. This is not to say that simplification does not have a place in instructional games but, rather, that the applicability to reality fades as one moves along the spectrum of more simplification.

A Possible Solution:

The dilemma is, then, to construct an instructional simulation game which is both relevant but simplified enough so that the process is emphasized more than the conclusion. In other words, the problem is how to use real data without the student becoming concerned with information, perceptions, or attitudes which are secondary to the processes. Good results can be achieved through a combination of "honest" deceit on the instructor's part and a lack of spatial knowledge by students.

Wilms and Steinbrink (1971) constructed a geo-political game called "Escalation" that used a method of presentation of reality without having the additional problem of background noise from the real world. Their strategy was to use an inverted and simplified map of Eastern Asia (Figure 1). The scenario is that the students make up the government cabinet of the country marked as "Homeland". The friendly nation of Y comes under attack from country D and its allies (A, B & C) because Y is supporting an insurgent movement in D. The class activity is to react to this conflict and its escalation on

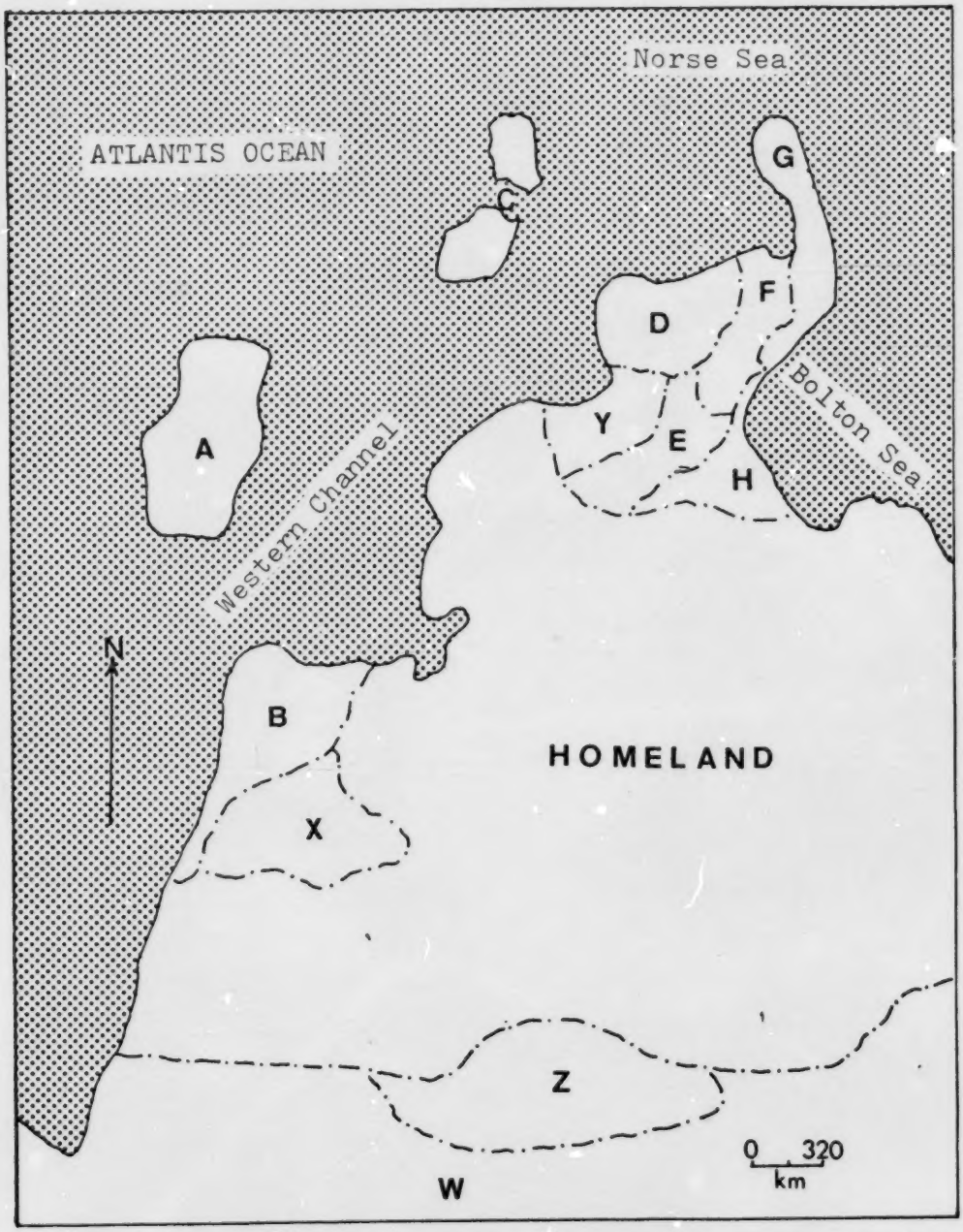

Figure 1: Game-Map for "Escalation," Wilms & Steinbrink, 1971, p. 495.

Homeland's sphere of influence. There is an element of surprise involved in "Escalation" when the students are confronted with the fact that in the real-world situation of Eastern Asia, Homeland is the Peoples' Republic of China and the conflict is the Vietnam War. (It would be an interesting exercise to re-write the game to existing realities in South-East Asia in light of the confrontations between United Vietnam on one hand and China and Cambodia on the other).

The inverted map is a deceitful act, so to speak, since the cartographic convention of placing north at the top of the map is being violated. This bit of trickery is, however, an "honest" move on the instructor's part since the inversion can be used as a learning instrument to explain the convention. In addition, the motive for the deceit is to create the illusion of simulation, that is, to cause the student to believe he is operating in a situation which is not "real". As such, the background noise of students' reaction to such concepts as war, communism, and Vietnam are avoided. At the conclusion of the game, Wilms and Steinbrink's (p. 496) action of turning the map image to its conventional mode, with north at the top of the map, demonstrates to the student two things:

1. Recognition of "... the cartographic custom of always placing north at the top of a map."
2. Realization "... that cartographic custom can lead to geographic stereotypes."

The background noise is re-introduced with the recognition of cartographic convention. The inverted map, therefore, serves

both to create a simulated situation and to becoming a learning situation in itself.

There is a danger in inverting the map in that it may be recognized as an inverted image by astute students. However, in my situation it is rare that this occurs. Two things usually prevent student recognition of inverted maps, one is an action on my part and the other is related to the students. I add to Wilms and Steinbrink's inverted map the further disguise of a mirror image. When the game map is turned to relate to correct cartographic custom, it is still reversed and thus the true locality can remain - to some extent - hidden still. It is, of course, necessary as Wilms and Steinbrink did, to only roughly outline the mapped image in order to limit recognition. The action on the students' part that assists this method of creating a simulation game is spatial ignorance.

This is not necessarily a bad thing; this lack of spatial knowledge. It is the result of a movement away from the regional geography syllabuses that used to abound in high schools. Students who come to university now from many of Canada's high schools lack the knowledge of places that was taught under the old capes and bays regime. As I noted, this is not necessarily a bad thing. This lack can be overcome in University through such teaching strategies as incorporating atlas exercises into practical and examination processes. However, during the first university course on geography, it is possible to utilize this lack of map knowledge to the instructor's advantage when he wants to create a simulation exercise. In addition, as Wilms and Steinbrink did, the exercise can be used to reinforce the

convention of cartographic customs.

The Example: Population Dynamics of Fairac

Just as Butt (1975) points out, the best developer of a simulation game for a class is the instructor himself. The game outlined here is useful for the particular aims I am trying to emphasize in my introductory course. Like any commercial game or any other instructor's simulation exercise, it will not be completely suitable for everybody. It is presented here only as an example of the technique of using an inverted mirror image in instructional simulation gaming.

The problem of suggesting topics around which to create games is a major one. The tendency is for the instructor to select a topic with which he is entirely familiar. There is, however, something to be said for choosing one which is less known, as I have done with this game on population dynamics. In this manner, the instructor makes the learning experience one that he can share with the student. This is a process which includes the construction of the game, the gathering of suitable data, and the playing of the game itself.

It is essential that the data used be easily related to the standard nomenclature that is being used in the course itself. I was, in a sense, lucky because by coincidence I read a journal article the same weekend I stumbled through the segment on population dynamics in the text in preparation for my classes. The similarity of terms was evident, which made the game which developed out of this incident easier to

construct. At Memorial University of Newfoundland we use Peter Haggett's Geography: A Modern Synthesis (1975) as the text for the two-semester introductory course. Chapter Six introduces the concepts of demography and the students usually state that it is at this point of the course that the material covered is new to them. It would appear from their comments (and performance) that Chapter Six establishes the true break-point from high school geography to university geography. As such, population dynamics are entirely a new topic for all students and requires more energy to be expended by both students and instructor to learn the concepts involved. The teaching strategy I have evolved is to conduct teacher-based discussion of the concepts as outlined by Haggett, followed by the simulation game and then concluding with a departmental-wide practical. One could call it a progression of knowledge attainment → group reinforcement → self reinforcement.

The data-source for the game is derived from an article in the Journal of Geography: Akinbode's "Population Explosion in Africa..." (1977). The game's title of Population Dynamics of Fairac uses the jumbled name of Africa - a technique which has so far escaped detection in four applications of the game.

The game itself has a competitive aspect to it. Butt (1975, p. 1) encourages such an approach as it enables the instructor "... to capitalize on the human tendency to play..." and to compete. The map image of Africa (Figure 2) is used but is mirrored and inverted. In addition, a land-bridge

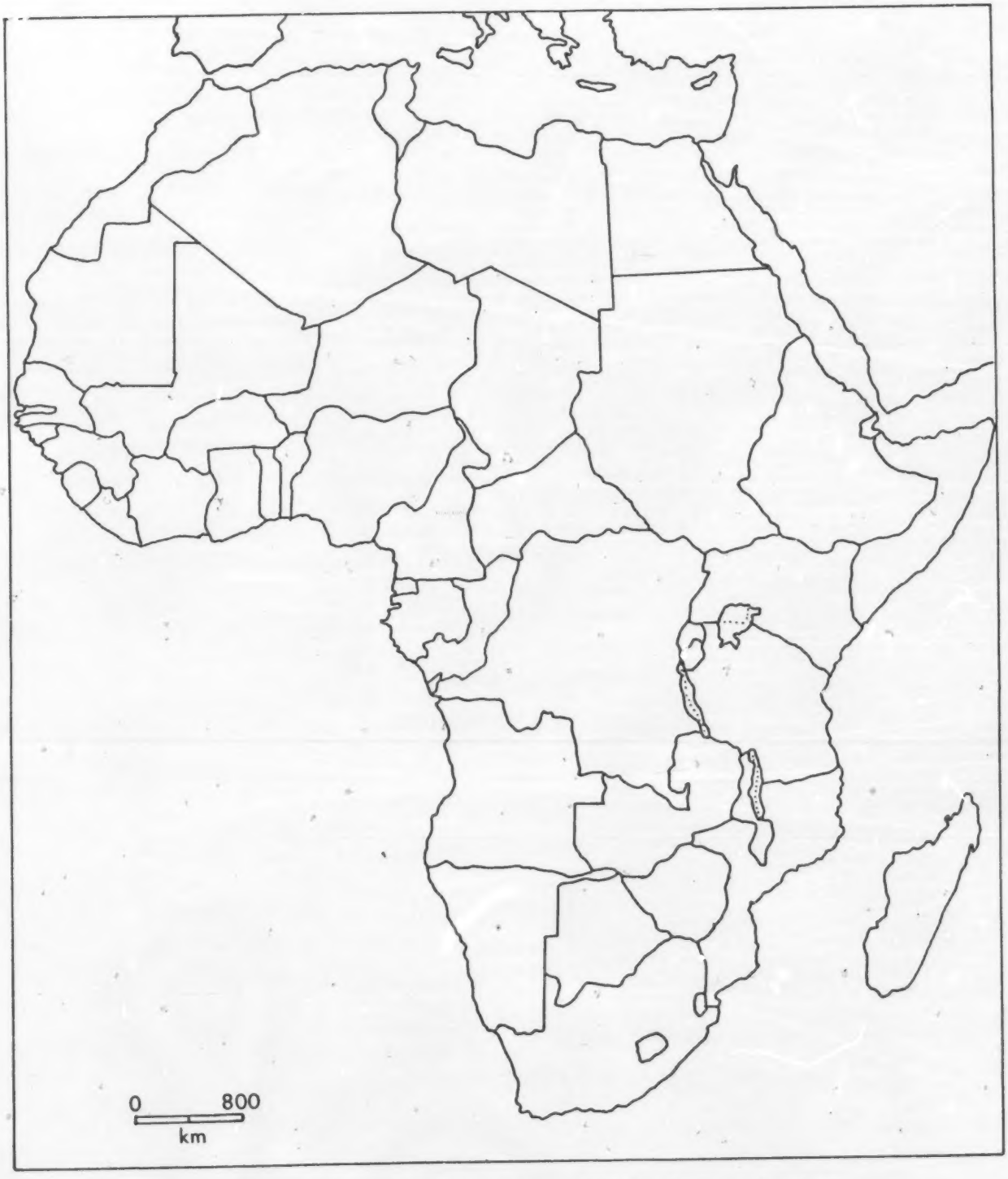

Figure 2: Africa with Political Boundaries

connects Madagascar. The resulting map (Figure 3) has been likened by students to a nesting buzzard. Since Akinbode's data are for the most part given by regions, it was decided to use the five regions of Africa as mythical countries. The names of the countries have been changed with each new use of the game - derivation of names should not come from actual countries since this may provide hints to students as to actual location; I have used names Anglicized from Latin and German on occasion.

The scenario is played over several days - usually three 50-minute sessions. Two sessions are spent in organizing and interpreting data in small groups while the last session is used for oral presentations. The class is divided into five teams which represent each of Fairac's "countries". Within each, a Prime Minister and Cabinet are selected. Data compiled from Akinbode are given out which reflect the population dynamics of the various regions of Africa; the data are changed to "Fairacian" terms and credited to UNESCO. The country-teams are then given the problem:

> The United Nations Secretary General has been authorized to spend $100 Million on economic development in Fairac next year. The Secretary General has determined that to split this money among the nations would be useless and has, therefore, decided to grant the entire sum to the country most desperately in need in Fairac. The Secretary General's criteria for granting the sum are based on the population characteristics of:
> 1. Population increases- past and future
> 2. Dependency ratios
> 3. Population densities.

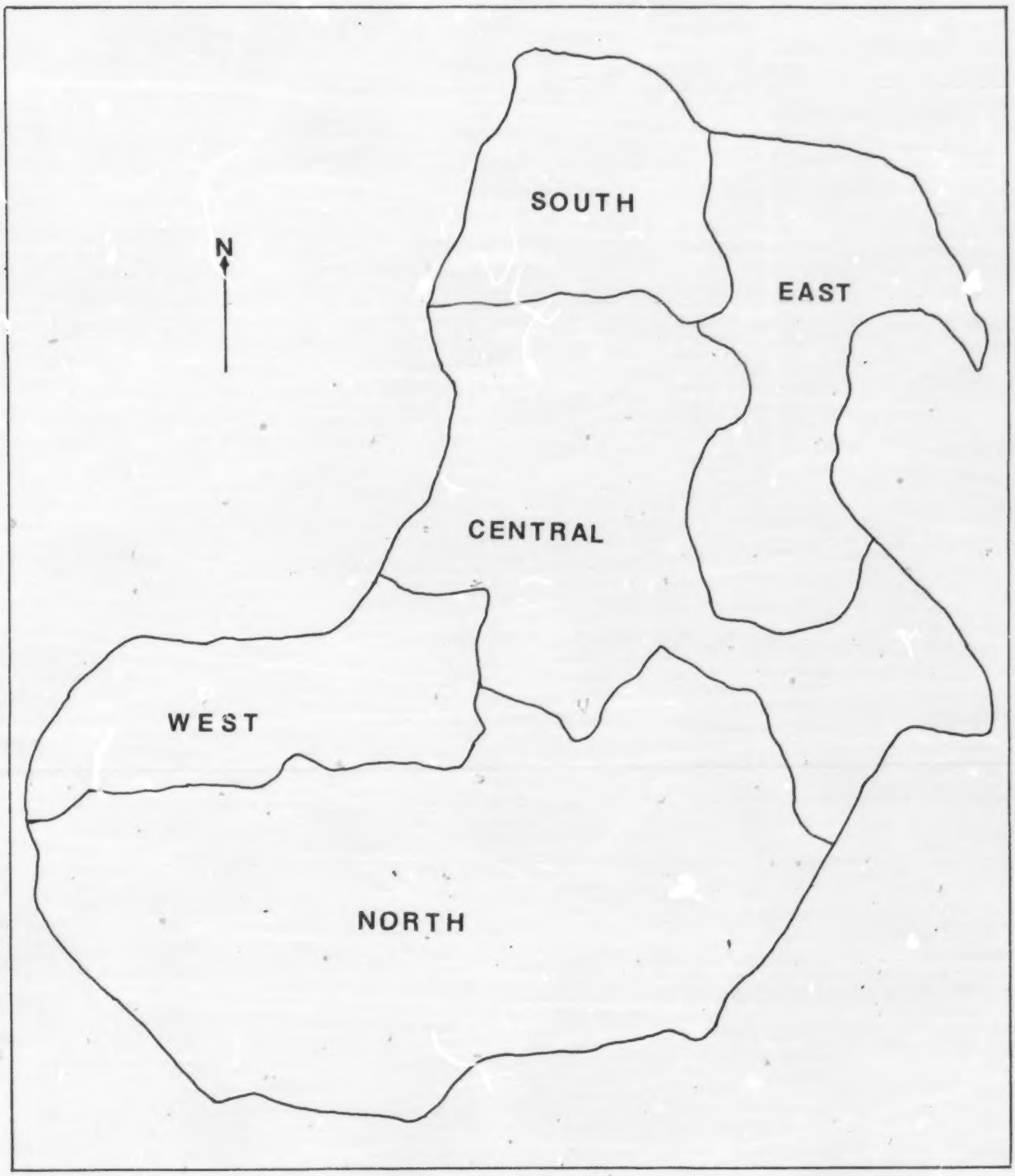

Figure 3: Fairac with Modified Regions of Africa

Each country-team spends two class-periods organizing a strategy for the final session. The oral presentation is made to the Secretary General who, at the conclusion of the exercise, must allot the $100 Million to one country. Since the instructor is involved in the organization and action of the game, it is essential that he not act as the Secretary General. It was found that using a person from outside the classroom provided the best results. This person needs to be an excellent "role player" and, as such, the selection of an appropriate personality to be Secretary-General is an important part of the game. The Secretary General's allocation of the money is essentially based on how pathetic the students interprete and present the data. Though results have been different in every playing of the game, it is surprising to find that those regions of Africa one would expect to be worse off do not receive the money. If the game were played using the real regions of Africa, there would be the danger of students introducing attitudinal information into the game process. It is probable that some students would be aware of the volatile situations in Africa (apartheid, Rhodesia, Nambia, Eritrea, Idi Amin, Zaire, etc.) as well as some of the economic realities of Saharan oil or South African gold. Recognition of these or other characteristics within the real world would drastically change the simulation exercise; possibly they could even destroy the game.

Analysis of Game:

It is necessary to recall that a central thesis of this paper is that a game which is to be useful as an

educational experience needs to be related to reality. At the conclusion of the game, there should be at least one class session spent on evaluating and analysing the game's place in the real world. In this game, this means that one must identify the regions of Africa which the data represent. The map is shown to the students in correct perspective (with north at the top) and the regions of Africa are correctly identified. The effects of population dynamics on the economic and political life of the regions can thus be better understood.

At the same time, the students can be introduced to the concept of "geographic stereotypes" to which Wilms and Steinbrink (1971) refer. One can explore, with the map of Africa, the stereotypecastings that students and the general public might have of peoples which inhabit that continent. The emphasis on Africa also serves to erase some of the ignorance which permitted the initial use of the inverted map in the game.

Conclusion:

An instructional simulation game can be used as a multi-purpose aid within an introductory university course. It is recognized as both a cognitive and motivational tool which can be an effective teaching resource when it is integrated into the instructional goals of the course.

The game, Population Dynamics of Fairac, provides the instructor with a means of meeting several behavioral objectives in an introductory geography course:

At the conclusion of the game the student should be able

to:

(1) Apply the concepts of population dynamics having been reinforced through the process of interpreting population data within the game.

(2) Recognize that there are established map conventions or customs, particularly that north should be at the top of the map.

(3) Comprehend that map conventions can also cause perceptions or attitudes to be developed about peoples and places which may not be related to reality.

The game gives the student the opportunity to motivate himself through a competitive process. In a sense, the game fulfills the Piagetian concept of student self-reinforcement through actual experience.

The instructor must relate the experience to reality or else the concept-attainment which the student has achieved will not be relevant to his studies much less the real world, but there is a danger of using real world situations in gaming since the background noise of the political and economic realities may overly influence the results of the exercise. Therefore, the reality must be simulated but not over-simplified so that it does not relate back to the original goal of the game. A possible solution is the use of inverted, mirror map images. In this manner, an illusion of an imaginary country is created but the data used in the simulation are real. It is in the evaluation of the game that the instructor must then relate the data to the real world through the action of presenting the game-map in its correct perspective.

REFERENCES

1. Ade. Akinbode, "Population Explosion in Africa and its Implications for Economic Development," Jour. of Geography, v. 76, n. 1, 1977, pp. 28-36.

2. R. Butt, "The Advantages of Simulation and Gaming as Instructional Devices: Changing Classroom Transactions," Learning and Development, (McGill Univ.), v. 6, n. 3, 1975, pp. 1-4.

3. P. Haggett, Geography: A Modern Synthesis, (New York, Harper & Row, 2nd Edition, 1975).

4. R. Hunter & R. E. Clark, "Simulation/Gaming Research," Educational Technology, July 1977, pp. 44-46.

5. E. Mayo, The Social Problems of an Industrial Civilization, (London, Routledge, 1957).

6. R. Walford, Games in Geography, (London, Longman, 1969).

7. D. C. Wilms & J.E. Steinbrink, "Escalation: A Simulation of Contemporary Geo-politics," Jour. of Geography, v. 70, n. 11, 1971, pp. 492-497.